No. 200200205

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Colorado Wheat Research Foundation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Avalanche'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twentieth day of September, in the year two thousand two.

Attest:

Commissioner
Plant Variety Protection Office

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
Colorado Wheat Research Foundation

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
CO940611

3. VARIETY NAME
Avalanche

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Dept. Soil and Crop Sciences
Colorado State University
Fort Collins, CO 80523

5. TELEPHONE *(include area code)*
970-491-6483

6. FAX *(include area code)*
970-491-0564

FOR OFFICIAL USE ONLY

PVPO NUMBER
200200205

FILING DATE
July 15, 2002

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Association

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

9. DATE OF INCORPORATION

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Scott D. Haley
Dept. Soil and Crop Sciences
Colorado State University
Fort Collins, CO 80523

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 2705.00
DATE 7/15/2002

CERTIFICATION FEE:
$ 320.00
DATE 9/13/02

11. TELEPHONE *(Include area code)*
970-491-6483

12. FAX *(Include area code)*
970-491-0564

13. E-MAIL
shaley@colostate.edu

14. CROP KIND *(Common Name)*
Wheat, Common

15. GENUS AND SPECIES NAME OF CROP
Triticum aestivum L.

16. FAMILY NAME *(Botanical)*
Graminae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

- a. ☒ Exhibit A. Origin and Breeding History of the Variety
- b. ☒ Exhibit B. Statement of Distinctness
- c. ☒ Exhibit C. Objective Description of Variety
- d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
- e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
- f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
- g. ☒ Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☒ YES *(If "yes", answer items 20 and 21 below)* ☐ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☒ YES ☐ NO
IF YES, WHICH CLASSES? ☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ YES ☐ NO
IF YES, SPECIFY THE NUMBER 1,2,3, *etc.* [1] FOUNDATION [1] REGISTERED [1] CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☒ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER	SIGNATURE OF OWNER
Scott Haley	
NAME *(Please print or type)* Scott Haley	NAME *(Please print or type)*
CAPACITY OR TITLE Assoc. Professor	DATE 7/16/02
CAPACITY OR TITLE	DATE

20020205

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,705 ($320 filing fee and $2,385 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

ITEM

18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

August 27, 2001 seed sold in Colorado, USA

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.gov/lsg/seed/ls-sd.htm

S&T-470 (04-01) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (02-99) which is obsolete.

PVP Application
Avalanche Hard White Winter Wheat
Exhibit A – Origin and Breeding History of the Variety

Pedigree – Avalanche was selected from the cross "KS87H325/Rio Blanco".

Experimental designation – Avalanche was assigned the experimental identification number CO940611 in 1994.

Parents – Avalanche originated from the same cross (e.g., is a sister selection) as the Kansas cultivar Trego released in 1999. The parents of both Trego and Avalanche are:

1) Rio Blanco – a wheat cultivar developed and released by Agripro in 1989.

2) KS87H325 – an unreleased experimental line from the Kansas State University-Hays Wheat Breeding Program. KS87H325 has the following pedigree:

"RL6005/RL6008//2*Larned/3/Cheney/Larned/4/Bennett sib/5/TAM 107"

Following are the breeding procedures used in the development of Avalanche:

1989 – A single cross was made between the two parents (KS87H325 and Rio Blanco) in the greenhouse at Hays, KS. F1 seed was harvested in April 1989.

1990 – F1 plants were grown in the field at Hays, KS, and harvested as a bulk in June 1990.

1991 – An F2-bulk population was grown in the field at Hays, KS, and harvested as a bulk in June 1991. No selection was made among F2 plants.

1992 – An F3-bulk population was grown in the field at Hays, KS, and individual heads were harvested in June 1992. Selection of F3 plants was done at random within the F3-bulk population.

1993 – F4 headrows were grown at Hays, KS, and a single row was harvested in bulk in June 1993. Selection among headrows was practiced for maturity, plant height, leaf rust resistance, and overall agronomic adaptation.

1994 – The F5 line was tested with other F5 lines in the preliminary yield test at three KS locations in 1994. Seed of some of the lines from these trials was transferred to Colorado State University (CSU) in an unrestricted germplasm exchange. Line designation CO940611 was assigned to one of these F3-derived lines by CSU in August 1994.

1995 – The F6 was tested in the single-replication preliminary yield nursery at five CO locations. Line CO940611 was advanced for further testing based on selection for grain yield, test weight, plant height, maturity, and overall agronomic adaptation.

1996 – The F7 was tested in the replicated advanced yield nursery at five CO locations. Line CO940611 was advanced for further testing based on selection for grain yield, test weight, plant height, maturity, and overall agronomic adaptation.

1997 – The F8 was tested in the replicated High Moisture Variety Trial (HMVT) at five CO locations. Line CO940611 was advanced for further testing based on selection for grain

yield, test weight, plant height, maturity, and overall agronomic adaptation. Seed stocks harvested from a seed increase block rogued for height variants were hand-sorted to eliminate red kernels from CO940611.

1998 – The F9 was tested in the replicated High Moisture Variety Trial (HMVT) at five nonirrigated CO locations and the replicated Low Moisture Variety Trial (LMVT) at five nonirrigated CO locations. Line CO940611 was advanced for further testing based on selection for grain yield, test weight, plant height, maturity, and overall agronomic adaptation. A seed increase block, planted from the hand-sorted seed stocks, was rogued for height variants and bulk harvested with a plot combine.

1999 – The F10 was tested in the replicated High Moisture Variety Trial (HMVT) at five nonirrigated CO locations and the replicated Low Moisture Variety Trial (LMVT) at five nonirrigated CO locations. Line CO940611 was advanced for further testing based on selection for grain yield, test weight, dough mixing characteristics (as determined by the Mixograph), plant height, maturity, and overall agronomic adaptation. For generation of Breeder Seed, approximately 300 heads were selected at random from a seed increase block rogued for height variants.

2000 – The F10 was tested in the replicated Uniform Variety Performance Trial (UVPT) at 10 nonirrigated CO locations. Line CO940611 was advanced for further testing and Foundation Seed increase based on selection for grain yield, test weight, dough mixing characteristics (as determined by the Mixograph), pup-loaf breadmaking characteristics, plant height, maturity, and overall agronomic adaptation. Breeder seed, originating from a composite of 262 F10-derived rows, was grown under irrigation in Yuma, AZ. Rows were harvested separately and visually examined for kernel color (purity and whiteness) prior to inclusion in the Breeder Seed composite.

2001 – The F11 was tested in the replicated Uniform Variety Performance Trial (UVPT) at 10 nonirrigated CO locations. A 12-acre Foundation Seed increase was grown near Fort Collins, CO. CO940611 was assigned the name Avalanche and released for sale to seed producers in August 2001.

Avalanche is uniform. Variants are limited to slightly taller plants that occur at a frequency of less than 1 in 1,000 plants, plants with brown glumes that occur at a frequency of less than 1 in 1,000 plants, and plants that produce seed with a red seed coat at a frequency of less than 1 in 200 plants. The variants in Avalanche as well as the typical plants in Avalanche are commercially acceptable.

Avalanche is stable. When sexually reproduced, Avalanche remains unchanged in its essential and distinctive characteristics. Avalanche was observed to be uniform and stable during the last four generations (advanced yield trials in 1998, preliminary seed increase in 1999, Breeder seed increase in 2000, Foundation seed increase in 2001).

PVP Application
Avalanche Hard White Winter Wheat
Exhibit B – Statement of Distinctness

Avalanche is a sister-selection of, and most similar to, the hard white winter wheat cultivar 'Trego' but differs in the following characteristics:

1) Avalanche reaches the ear emergence growth stage (Feekes scale 10.5) approximately 1.7 days earlier than Trego (data below).

Number of days (from January 1) to ear emergence for Trego and Avalanche hard white winter wheat cultivars in CSU Variety Performance Trials. Values are the average of three replications for each year/location combination.

Year	Location	Trego	Avalanche	Difference
		--------- days from January 1 ---------		
1999	Akron	146.7	145.0	1.7
1999	Akron	147.7	145.0	2.7
1999	Burlington	143.7	142.7	1.0
1999	Burlington	143.3	142.7	0.7
1999	Fort Collins	152.3	150.0	2.3
1999	Lamar	139.7	138.0	1.7
1999	Walsh	138.3	136.0	2.3
2000	Akron	146.0	142.7	3.3
2000	Burlington	137.7	137.0	0.7
2000	Fort Collins	142.5	142.0	0.5
2001	Burlington	143.7	141.7	2.0
2001	Fort Collins	150.7	149.0	1.7
Average		144.3	142.6	1.7 **

** Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 6.72; df = 11; P<0.001; upper/lower 95% confidence interval = 1.15 – 2.27 days).

2) Avalanche and Trego show three clear differences in their seed storage protein banding pattern as revealed by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) analysis (see **Photograph 1** attached).

3) Avalanche and Trego show four clear differences in their DNA fingerprinting pattern as revealed by amplified fragment length polymorphism (AFLP) analysis using the AFLP primers E-AGG M-CAG (see **Photograph 2** attached).

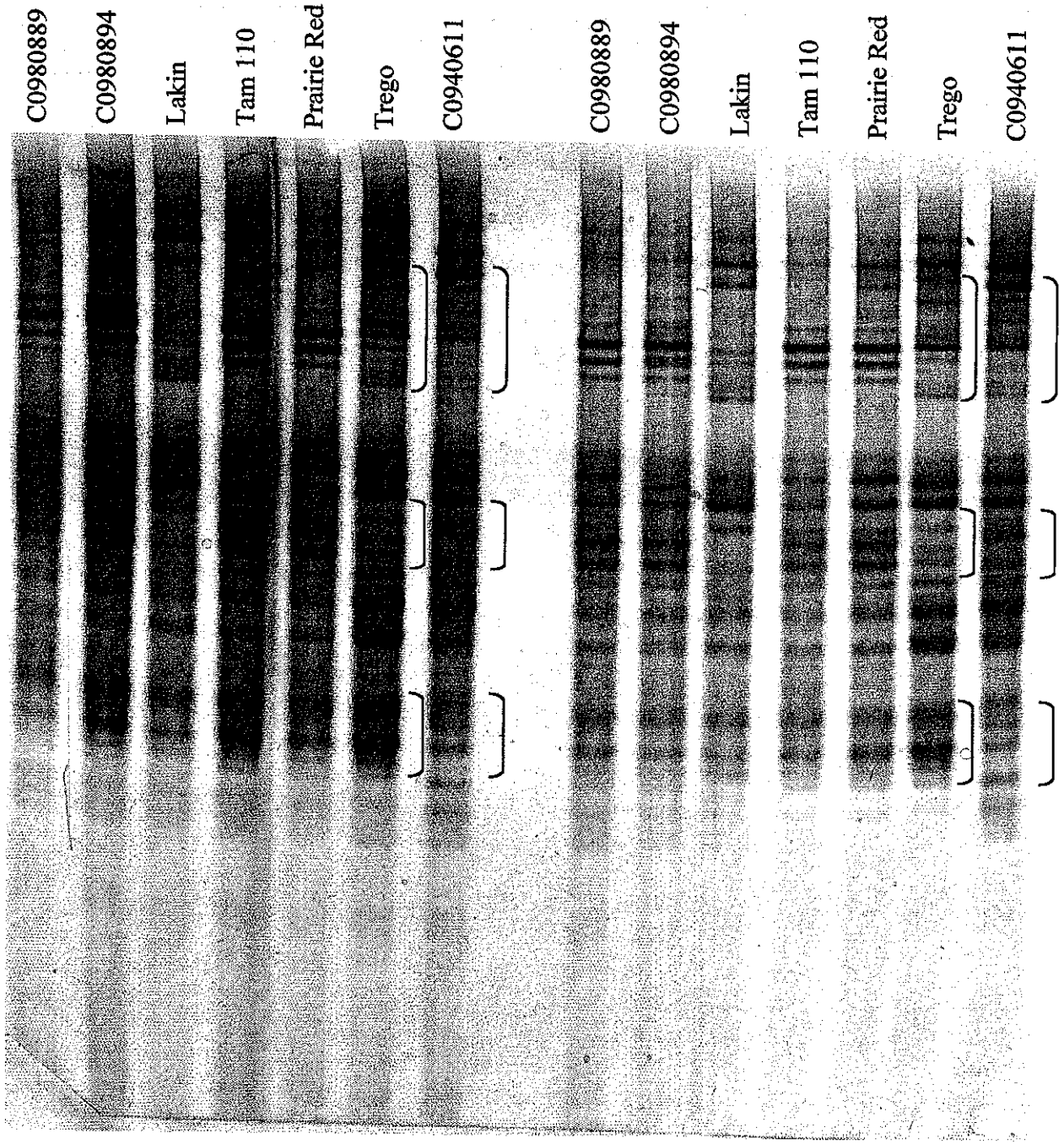
4) Avalanche and Trego show one clear difference in their DNA fingerprinting pattern as revealed by amplified fragment length polymorphism (AFLP) analysis using the AFLP primers E-ACC M-CTA (see **Photograph 3** attached).

5) Avalanche and Trego show one clear difference in their high molecular weight subunit composition, with Trego showing the 17+18 subunits while Avalanche shows the 7+8 subunits (see **Photograph 4** attached).

Photograph 1

CSU Wheat
SDSU Seed Testing Lab
Gel #01-33A
03/29/01

Band differences between **Avalanche** (CO940611) and **Trego** are highlighted by brackets.



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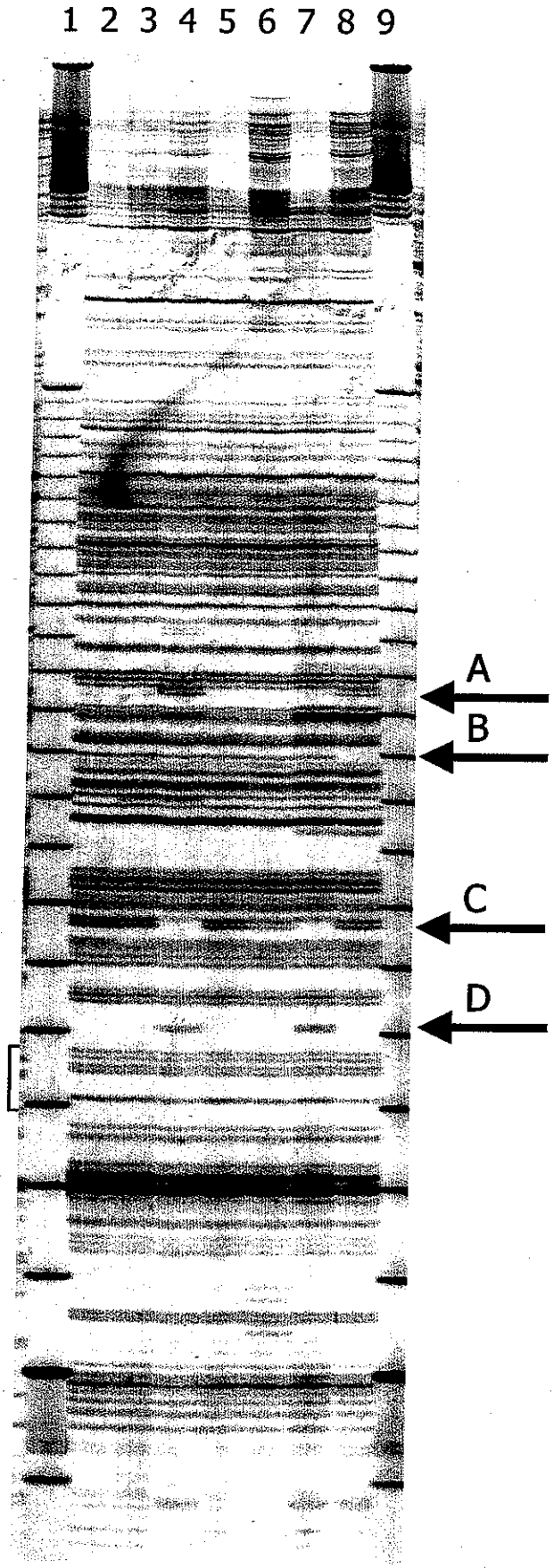


Photograph 2

Amplified PCR products with AFLP primers E-AGG M-CAG, using Invitrogen Life Technologies AFLP Analysis System 1 Kit (Cat.#10544-013).

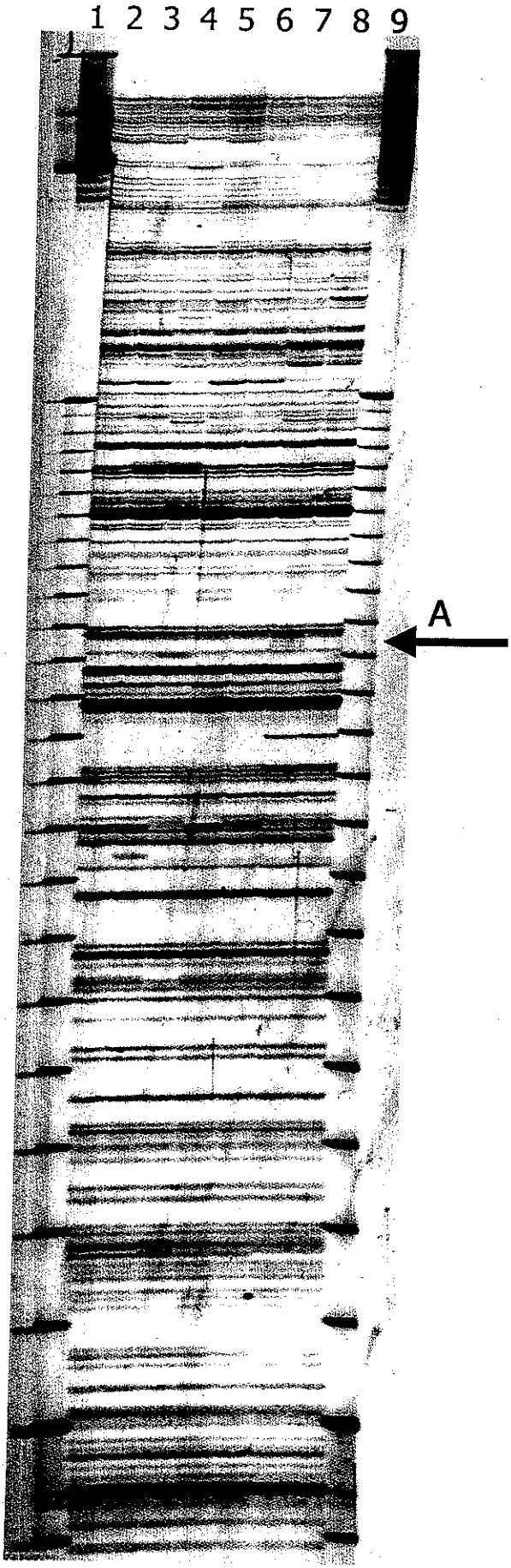
1 = Invitrogen Life Technologies 10 bp DNA Ladder (Cat.#10821-015)
2 = CO980889
3 = CO980894
4 = Lakin
5 = TAM110
6 = Prairie Red
7 = Trego
8 = CO940611 (AVALANCHE)
9 = Invitrogen Life Technologies 10bp DNA Ladder (Cat.#10821-015)

Arrow A: 205 bp DNA band present in Lakin and CO940611, absent in Trego

Arrow B: 190 bp DNA band present in Lakin and Trego, absent in CO940611

Arrow C: 157 bp DNA band present in CO940611, absent in Lakin and Trego

Arrow D: 141 bp DNA band present in Lakin and Trego, absent in CO940611

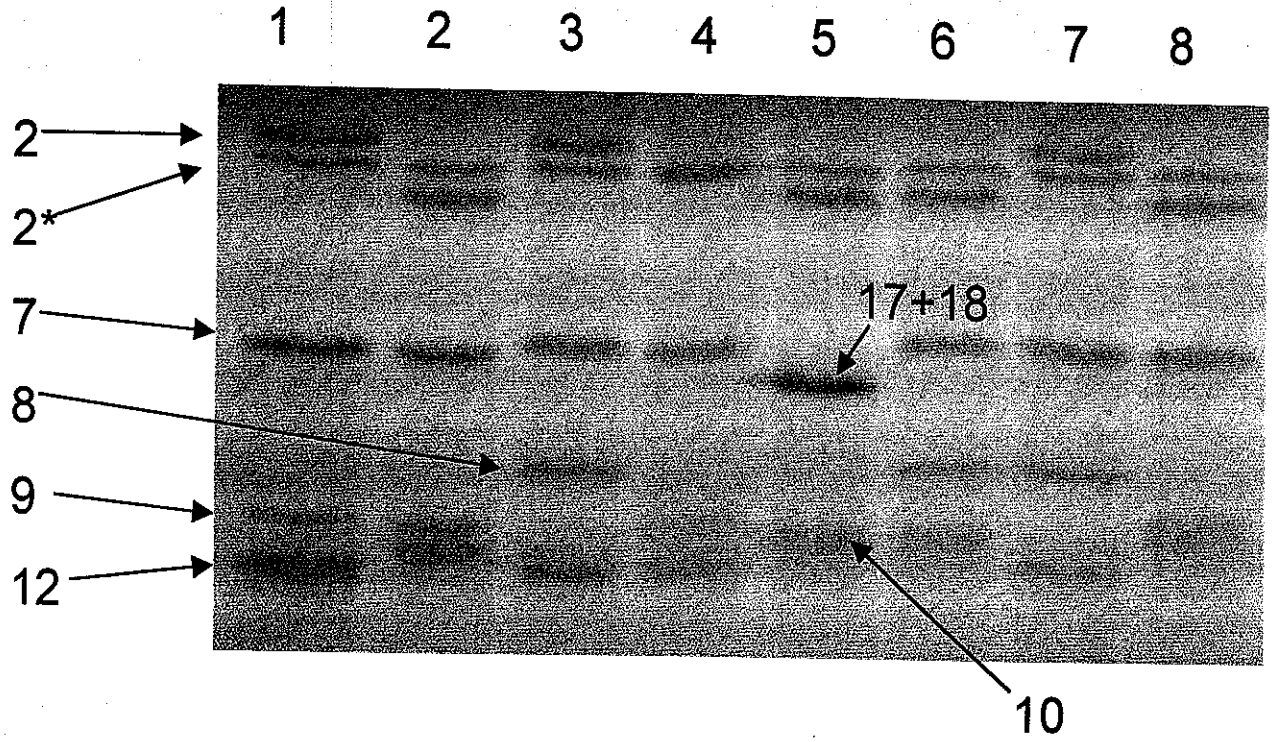


Photograph 3

Amplified PCR products with AFLP primers E-ACC M-CTA, using Invitrogen Life Technologies AFLP Analysis System 1 Kit (Cat.#10544-013).

1 = Invitrogen Life Technologies 10 bp DNA Ladder (Cat.#10821-015)
2 = CO980889
3 = CO980894
4 = Lakin
5 = TAM110
6 = Prairie Red
7 = Trego
8 = CO940611 (AVALANCHE)
9 = Invitrogen Life Technologies 10bp DNA Ladder (Cat.#10821-015)

Arrow A: 224 bp DNA band present in Trego, absent in Lakin and CO940611



1=Scout66:2*, 7+9, 2+12

2=Kharkof: 2*, 7+9, 5+10

3=TAM107: 2*, 7+8, 2+12

4=Cimarron:2*, 7+9, 3+12

5=Trego: 2*, 17+18, 5+10

6=Avalanche: 2*, 7+8, 5+10

7=Prairie Red: 2*, 7+8, 2+12

8=Lakin: 2*, 7+9, 5+10

Photograph 4

Notes: In this gel system, 2* and 3 do not separate, nor do 17& 18

REPRODUCE LOCALLY. Include form number and date on all reproductions. Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(*Wheat*)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S)
COLORADO WHEAT RESEARCH FOUNDATION

ADDRESS (Street and No. or RD No., City, State, and Zip Code)
c/o Scott D. Haley
Dept. Soil and Crop Sciences
Colorado State University
Fort Collins, CO 80523

FOR OFFICIAL USE ONLY

PVPO NUMBER 20020205

VARIETY NAME
Avalanche

TEMPORARY OR EXPERIMENTAL DESIGNATION
CO940611

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [0][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:
Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1] 1=Common 2=Durum 3=Club 4=Other (SPECIFY) : _____

2. VERNALIZATION:

[2] 1=Spring 2=Winter 3=Other (SPECIFY) : _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[1] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR (boot stage):

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF (boot stage):

[1] 1 = Erect 2 = Recurved [1] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[0][2] Number of Days Earlier Than Tregro *

[0][4] Number of Days Later Than TAM 107 *

8. ANTHER COLOR:

[1] 1 = Yellow 2 = Purple

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9. PLANT HEIGHT (from soil to top of head, excluding awns):

[0][3] cm Taller Than TAM 107 *

[0][8] cm Shorter Than Prowers 99 *

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN

[1] 1= Absent 2=Present

B. WAXY BLOOM

[2] 1=Absent 2=Present

C. HAIRINESS (last internode of rachis)

[2] 1=Absent 2=Present

D. INTERNODE (SPECIFY NUMBER)

[1] 1= Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE

[2] 1=Absent 2=Present

[18] cm Length

. HEAD (at Maturity):

A. DENSITY

[2] 1=Lax 2=Middense 3= Dense

B. SHAPE

[1] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (SPECIFY): _____

C. CURVATURE

[2] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

[4] 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

GLUMES (at Maturity):

A. COLOR

[1] 1 = White 2 = Tan 3 = Other (SPECIFY) : _____

B. SHOULDER

[5] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

[3] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH

[2] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

12. GLUMES (at Maturity) *Continued*:

E. WIDTH

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[2] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

[1] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

[1] 1=Rounded 2=Angular

C. BRUSH

[2] 1=Short 2=Medium 3=Long

[1] 1 = Not Collared 2 = Collared

D. CREASE

[2] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[1] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. Color

[1] 1=White 2= Amber 3= Red
4= OTHER (Specify)

G. PHENOL REACTION *(see instructions)*:

[3] 1 = Ivory 2 = Fawn
3 = Light Brown 4 = Dark Brown
5 = Black

F. TEXTURE

[1] 1=Hard 2=Soft

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[2]	Stem Rust *(Puccinia graminis* f. sp. *tritici)* (mixture)	[3]	Leaf Rust *(Puccinia recondita* f. sp. *tritici)* (mixture)
[1]	Stripe Rust *(Puccinia striiformis)* (mixture or unknown)	[1]	Loose Smut *(Ustilago tritici)*
[0]	Tan Spot *(Pyrenophora tritici-repentis)*	[0]	Flag Smut *(Urocystis agropyri)*
[0]	Halo Spot *(Selenophoma donacis)*	[0]	Common Bunt *(Tilletia tritici* or *T. laevis)*
[0]	*Septoria nodorum* (Glume Blotch)	[0]	Dwarf Bunt *(Tilletia controversa)*
[0]	*Septoria avenae* (Speckled Leaf Disease)	[0]	Karnal Bunt *(Tilletia indica)*
[0]	*Septoria tritici* (Speckled Leaf Blotch)	[0]	Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)*
[0]	Scab (*Fusarium* spp.)	[0]	"Snow Molds"

14. Disease *(Continued)* (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

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PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[0]	"Black Point" (Kernel Smudge)	[0]	Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.*)*
[1]	Barley Yellow Dwarf Virus (BYDV)	[0]	Rhizoctonia Root Rot *(Rhizoctonia solani)*
[2]	Soilborne Mosaic Virus (SBMV)	[0]	Black Chaff *(Xanthomonas campestris* pv. *translucens)*
[0]	Wheat Yellow (Spindle Streak) Mosaic Virus	[0]	Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)*
[4]	Wheat Streak Mosaic Virus (WSMV)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

[1]	Hessian Fly *(Mayetiola destructor)* (Great Plains Biotype)	[ ]	Other (SPECIFY)
[0]	Stem Sawfly *(Cephus* spp.)	[ ]	Other (SPECIFY)
[0]	Cereal Leaf Beetle *(Oulema melanopa)*	[ ]	Other (SPECIFY)
[1]	Russian Aphid *(Diuraphis noxia* (USA Biotype)	[ ]	Other (SPECIFY)
[1]	Greenbug *(Schizaphis graminum)* (Biotype E)	[ ]	Other (SPECIFY)
[0]	Aphids	[ ]	Other (SPECIFY)

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

PVP Application
Avalanche Hard White Winter Wheat
Exhibit D – Additional Description of the Variety (optional)

The following additional descriptive information is presented:

1) Grain yield and test weight data from the Colorado Dryland Variety Performance Trials from the 1998-2001 growing seasons (**Table 1**) and the 1999-2001 growing seasons (**Table 2**).

2) End-use quality characteristics of Avalanche (**Table 3**).

Table 1. Grain yield and test weight for CO940611 and winter wheat cultivars tested in Colorado Dryland Variety Performance Trials (1998-2001).

ID (no. years)	Akron (n=4)	Burlington (n=4)	Genoa (n=4)	Julesburg (n=4)	Bennett (n=3)	Lamar (n=4)	Walsh (n=4)	Briggsdale (n=3)	ShLake (n=2)	ChWells (n=4)	Average (n=36)	Test Wt. Avg. (n=36)
	bu a^{-1}											-- lb bu^{-1} --
Alliance	51.3	48.4	56.6	50.4	63.1	57.2	47.4	54.6	63.5	48.2	53.3	56.9
Akron	53.6	43.3	58.0	48.4	68.3	52.9	47.1	52.4	59.3	44.7	52.0	57.3
CO940611 (HW)	**51.9**	**49.6**	**56.9**	**47.9**	**57.4**	**54.2**	**52.4**	**49.0**	**61.5**	**43.4**	**51.9**	**58.6**
Enhancer	55.5	44.7	59.5	50.2	61.6	52.7	46.6	48.2	59.9	44.6	51.8	56.4
Yuma	50.6	45.6	55.1	53.1	57.9	52.6	49.3	50.6	58.6	44.4	51.2	56.8
TAM 107	51.7	45.8	51.0	47.5	52.4	51.2	47.1	52.6	59.6	45.3	49.8	56.5
2137	45.1	44.7	54.4	47.8	60.2	52.7	46.6	49.2	62.8	42.1	49.7	56.8
Prairie Red	48.6	46.9	51.7	47.2	57.4	49.5	46.3	53.6	60.7	43.6	49.7	56.9
TAM 110	46.2	47.6	54.6	50.9	57.9	47.7	44.7	52.5	54.9	44.4	49.6	56.5
Halt	48.6	44.3	54.8	49.8	57.3	48.2	43.6	55.6	49.5	43.2	49.1	56.6
Yumar	50.3	44.2	52.4	49.3	60.1	49.1	46.3	45.6	57.7	41.5	49.0	57.6
Wichita	34.8	32.4	40.2	36.2	43.5	38.5	36.0	38.9	43.2	35.8	37.5	58.2

Table 2. Grain yield and test weight for CO940611 and winter wheat cultivars tested in Colorado Dryland Variety Performance Trials (1999-2001).

Entry (no. years)	Akron (n=3)	Burlington (n=3)	Genoa (n=3)	Julesburg (n=3)	Bennett (n=2)	Lamar (n=3)	Walsh (n=3)	Briggsdale (n=2)	ShLake (n=1)	ChWells (n=3)	Average (n=26)	Test Wt. Avg. (n=26)
	bu a^{-1}											-- lb bu^{-1} --
Trego	56.6	43.8	59.9	46.1	57.0	51.8	55.0	52.2	69.2	47.7	53.9	58.9
Alliance	55.9	46.1	60.7	45.0	62.4	49.2	46.0	57.8	63.4	45.8	53.2	56.6
Enhancer	58.2	42.9	65.9	46.8	57.8	44.3	45.5	50.2	64.2	44.1	52.0	56.1
Akron	55.9	40.3	62.2	42.5	66.5	45.2	44.8	55.7	63.1	43.6	52.0	57.0
CO940611	**54.5**	**47.7**	**61.0**	**44.8**	**54.0**	**46.3**	**51.7**	**51.0**	**66.3**	**42.3**	**51.9**	**58.9**
Yuma	54.8	43.4	60.5	48.4	54.4	44.4	48.2	51.5	63.8	42.2	51.2	56.6
2137	47.0	40.9	57.8	44.0	58.5	46.5	46.2	52.8	72.1	42.2	50.8	56.6
Prairie Red	54.6	43.6	55.3	43.4	56.3	44.1	45.2	57.3	64.4	42.2	50.6	56.8
Yumar	52.1	42.0	57.3	46.2	59.2	43.6	45.3	47.9	63.6	41.1	49.8	57.3
Kalvesta	52.0	46.1	54.4	43.4	52.0	46.0	43.3	49.9	60.4	43.8	49.2	58.0
TAM 110	49.2	44.4	58.0	47.3	55.3	37.5	42.8	55.8	56.7	41.9	48.9	56.2
TAM 107	53.1	42.7	53.7	44.8	45.4	42.0	45.0	54.5	61.5	43.8	48.7	56.7
Halt	50.7	40.0	59.2	43.9	56.9	41.0	42.5	58.5	49.0	41.8	48.4	56.4
Venango	48.8	44.2	56.2	42.2	53.1	44.0	45.4	44.7	59.7	39.4	47.8	58.3
Wichita	39.0	31.5	42.7	32.0	40.5	33.9	35.8	41.1	45.4	34.5	37.6	58.5

Table 3. Milling and breadmaking characteristics of CO940611, Trego, and TAM 107 across six composite quality evaluations in 1999 (SRPN and Colorado UVPT) and 2000 (Colorado UVPT).

Trait (unit of measurement)	CO940611	Trego	TAM 107
Grain volume weight (kg m^{-3})	61.1	61.4	58.9
Percent large kernels (percent)†	60.9	60.3	63.5
Kernel weight (mg)	31.0	31.4	30.4
SKCS kernel hardness (score)‡	66.7	68.5	70.4
Flour ash (g kg^{-1})	4.4	4.2	4.2
Flour extraction (g kg^{-1})	681	673	661
Flour protein content (g kg^{-1})	113	111	116
Water absorption (g kg^{-1})	662	617	629
Bake mix time (min)	4.1	4.3	4.2
Mixograph tolerance (score)§	3.3	2.7	3.3
Loaf volume (L)	0.87	0.85	0.89
Crumb grain score (score)¶	3.4	3.2	3.1

† Percent kernels that do not pass through a Tyler #7 Sieve (2.92 mm openings).

‡ Single kernel characterization system (SKCS) hardness index value.

§ Mixograph tolerance score: 6=outstanding, 0=unsatisfactory.

¶ Crumb grain score: 6=outstanding, 0=unsatisfactory.

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Colorado Wheat Research Fnd.	CO940611	Avalanche
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)	5. TELEPHONE (Include area code)	6. FAX (Include area code)
Dept. Soil and Crop Sciences Colorado State University Fort Collins, CO 80523	970-491-6483	970-491-0564
	7. PVPO NUMBER	20020205

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain** [X] YES [ ]

9. Is the applicant (individual or company) a U.S. National or a U.S. based company? **If no, give name of country** [X] YES [ ] NO

10. Is the applicant the original owner? [ ] YES [X] NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

[ ] YES [ ] NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

[X] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

The cultivar for which Plant Variety Protection is hereby sought, was developed by a CSU team led by Dr. Scott Haley, and employee of Colorado State University (CSU). By agreement between Dr. Haley and CSU, all rights to all cultivars developed by him while employed by CSU were assigned to CSU. Ownership of the cultivar has been transferred from CSU to the Colorado Wheat Research Foundation, Inc., 7700 E. Arapahoe Road, Suite 220, Englewood, CO 80112.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.